

REMARKS

This paper is being presented in response to the final official action dated May 12, 2005, wherein: (a) claims 1-4 and 6-9 are pending; (b) claims 1, 2, and 6-9 have been rejected under 35 USC § 103(a) as being obvious over alleged admissions by the applicant in view of Huang U.S. Patent No. 6,150,073 (the "Huang patent") and further in view of Hawley et al. U.S. patent application publication No. 2003/0205723 (the "Hawley publication"); and, (c) claims 3 and 4 have been rejected under § 103(a) as being obvious over alleged admissions by the applicant in view of the Huang patent as applied to claim 1, and further in view of Levy et al. U.S. patent application publication No. 2004/0142557 (the "Levy publication").

This paper also is being presented in accordance with 37 CFR § 1.116(b)(1) and (b)(2) in an effort to place the application in condition for allowance or in better condition for consideration on appeal. The amendments and arguments presented herein were not presented in prior communications to the U.S. Patent and Trademark Office ("PTO") due to the applicant's good faith belief that all prior rejections had been overcome by amendment and/or argument.

Accordingly, entry of the foregoing amendments is believed to be proper and is solicited.

Reconsideration and withdrawal of the rejections are respectfully requested in view of the foregoing amendments and following remarks.

I. Brief Summary of the Amendments

Independent claim 1 has been amended to more accurately specify that the bit line metal film is formed on the entire structure including the metal hard-mask film to bury the bit line trench. Support for this amendment can be found in the specification at, for example, paragraphs [0015] and [0035], and the drawing figures referred to therein. Claim 1 also has been amended to more accurately specify that the bit line metal film and the metal hard mask film on the interlayer insulation film are removed "with a metal material by means of CMP." Support for this amendment can be found in the specification at, for example, paragraph [0035], which states that the bit line is formed by removing the bit line metal film and the metal hard-mask film on the second interlayer insulation film using a chemical and mechanical polishing process. Still further, claim 1 has been amended to more accurately specify that "the metal hard-mask film and the bit line metal film are formed using the same metal material so that the metal hard-mask film and the bit line metal film can be removed at the same time by the CMP." Support for this amendment can be found in the specification at, for example, paragraphs [0038] and [0042], which respectively state that:

The metal hard-mask film 120 on the second interlayer insulation film 118 also can be removed at the same time of forming a pattern of the bit line 130 by carrying out only the chemical and mechanical polishing process.

and:

[S]ince the metal hard-mask film is also removed at the same time of carrying out the planarization process of forming the bit line, an additional process of removing the metal hard-mask film is not required.

See paragraphs [0038] and [0042] of the specification.

No new matter has been introduced by the foregoing amendments to claim 1.

II. The 35 USC § 103(a) Rejection is Traversed

Pending claims 1, 2, and 6-9 have been rejected under 35 USC § 103(a) as being obvious over alleged admissions by the applicant in view of the Huang patent and further in view of the Hawley publication. Pending claims 3 and 4 have been rejected under § 103(a) as being obvious over alleged admissions by the applicant in view of the Huang patent as applied to claim 1, and further in view of the Levy publication. See pp. 2-4 of the action. A response to the obviousness rejection is set forth below.

A. Proper Basis for a § 103(a) Rejection

For the sake of brevity, the applicant refers to pages 6 and 7 of the paper filed April 22, 2005 ("Amendment 'A' and Response to Official Action"), for a recitation of the proper basis for a § 103(a) rejection. That recitation is incorporated herein by reference.

B. No Prima Facie Case of Obviousness Has Been Made and, therefore, the § 103(a) Rejection is Traversed

The Huang patent and the Hawley publication **do not** teach or suggest all of the limitations recited in claim 1 (and claims 2-4 and 6-9 dependent therefrom). Thus, no prima facie case of obviousness has been made in the instant action, and none exists based on the combination of the applied publications. Accordingly, reconsideration and withdrawal of the § 103(a) rejection are respectfully requested.

In the present invention, a bit line metal film and a metal hard-mask pattern are removed at the same time by the CMP. Therefore, the bit line metal film and the metal hard-mask pattern should be formed of the same material.

The action alleges that the Huang patent discloses a metal hard mask formed of tungsten. However, referring to column 3 lines 12-17 of the Huang patent, the metal hard mask (214) is formed of a metal material selected from Ti, TiN, Ta, TaN and WN. In addition, referring to column 3 lines 46-49 of the Huang patent, a metal layer (210) is formed of a metal

material selected from Cu, Al and Al-Cu alloy. As mentioned above, the Huang patent does not disclose that the metal hard mask and the metal layer are formed of the same material. Furthermore, the Huang patent does not disclose that the metal hard mask and the metal layer are removed at the same time by the CMP.

The action also alleges that the Hawley publication discloses a tungsten bit line (20) and a tungsten hard mask (28). However, the tungsten bit line is formed below the tungsten hard mask. In addition, the Hawley publication does not teach or suggest that the tungsten hard mask pattern is removed by CMP. Furthermore, the Hawley publication discloses that an antifuse layer (22) and barrier metal layer (24) are formed between the tungsten bit line and the tungsten hard mask. Therefore, it is difficult that the tungsten bit line and the tungsten hard mask are removed at the same time by the CMP.

Given these shortcomings, it is respectfully submitted that the claimed invention is unobvious over the applied publications. Accordingly, reconsideration and withdrawal of the § 103(a) rejections are respectfully requested.

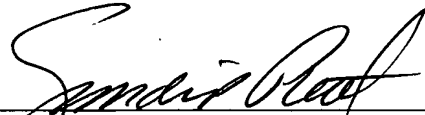
CONCLUSION

In view of the foregoing, entry of amendments to claim 1, reconsideration and withdrawal of the rejections, and allowance of all pending claims 1-4 and 6-9 are respectfully requested.

Should the examiner wish to discuss the foregoing, or any matter of form or procedure in an effort to advance this application to allowance, he is urged to contact the undersigned attorney.

Respectfully submitted,

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